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# Gregory S. Parnell Interview (MORS)

Parnell, Gregory S.

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## INTRODUCTION

Greg Parnell was MORS President in 1993–1994, was elected a Fellow of MORS in 1997, and was the Clayton Thomas Laureate in 2002. He was Editor of the *Military Operations Research Journal* from 1996 to 2001. Greg is currently a professor of systems engineering at the United States Military Academy at West Point and a senior principal at Innovative Decisions Inc. This interview was conducted in Greg's office in Mahan Hall, West Point on 21 June 2005.

**BOB SHELDON:** Today is the 21<sup>st</sup> of June, 2005 and we're here at Greg Parnell's office at West Point for an oral history interview. First of all, tell us where you were born and raised.

**GREG PARNELL:** Before we start, I am honored to be interviewed and pleased to learn that you have started a youth movement in the MORS heritage program! I was born in Rochester, New York, and I was raised in several small towns in and around the city.

**BOB SHELDON:** Where did you go to high school?

**GREG PARNELL:** I went to two high schools: Avon High School and Caledonia-Mumford High School. Both are south of Rochester.

**BOB SHELDON:** Give me your parents' names.

**GREG PARNELL:** George Samuel Parnell and Mary Church Parnell.

**BOB SHELDON:** Did they influence your decision to study mathematics and operations research?

**GREG PARNELL:** No.

**BOB SHELDON:** Did you take an early interest in math?

**GREG PARNELL:** Yes, I was interested in math, physics, and chemistry. My high school math teacher helped me develop my abilities in algebra, trigonometry and geometry.

**BOB SHELDON:** Where did you go to college?

**GREG PARNELL:** For undergraduate studies, I attended State University of New York at Buffalo and majored in aerospace engineering. I did my masters at University of Florida in industrial and systems engineering. I did a part time degree in systems management at University of Southern California. Finally, I did my Ph.D. at Stanford in engineering-economic systems. The department is now called Management Science and Engineering.

**BOB SHELDON:** Were you an ROTC scholarship student?

**GREG PARNELL:** Yes. I received one of the first three-year Air Force ROTC scholarships. This was before the Air Force started the four-year scholarship program. After completing the program as a distinguished graduate, I received a regular commission in the Air Force in 1970.

**BOB SHELDON:** Going from your bachelors to your masters, how did you decide on your field?

**GREG PARNELL:** That's an interesting story. I was an aerospace engineering undergraduate. I was working in space operations and I wanted to get an MBA. The Air Force needed engineers and wanted to send me for an engineering degree. I wasn't real sure what I was getting into, but industrial and systems engineering sounded useful.

**BOB SHELDON:** Did you have other assignments before getting your masters?

**GREG PARNELL:** I had three one-year assignments before my masters program. Two space operations assignments; one in the Space Operations Center in Colorado Springs, one at a Spacetrack Site in Diyarbakir, Turkey. Then I had my first of several acquisition management assignments at Wright Patterson Air Force Base while I was waiting for my school slot.

**BOB SHELDON:** What was your career field?

**GREG PARNELL:** I was originally in the space operations career field. When I was in Air Force ROTC, I looked at the assignment book and it said "Space operations officers command and direct sensors throughout the world" so I thought that was pretty good. When I got on active duty, I found out that "throughout the world" included Alaska and Greenland! Early on, I learned the decision analysis principal of the Value of Information.

# Military Operations Research Society (MORS) Oral History Project Interview of Gregory S. Parnell, FS

**Dr. Bob Sheldon, FS**

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MILITARY OPS  
RESEARCH  
HERITAGE ARTICLE

**BOB SHELDON:** Did you volunteer to go to Turkey right away, or was that a normal rotation?

**GREG PARNELL:** I went to Colorado Springs on a four-year controlled tour. However, my commander released his junior officers to go to remote after one year. So I had a choice of going to Shemya, Alaska; Clear, Alaska; Thule, Greenland, or Diyarbakir, Turkey. Turkey was the best trade-off of mission and location. This was one of my first multiple objective decisions!

**BOB SHELDON:** How did you like Turkey?

**GREG PARNELL:** It was very interesting. Someone told me that if you want to appreciate Turkey, you have to appreciate different shades of brown. We were in a remote area, about 700 miles from the Russian border. The nearest city was Diyarbakir, the home of Mustafa Kemal Ataturk, the famous leader of Turkey. I was able to travel to some of the surrounding area. One of the interesting trips was to the Mt Ararat region.

**BOB SHELDON:** Where did you go after Turkey?

**GREG PARNELL:** I went to my first acquisition management assignment at Wright Patterson Air Force Base, Ohio. I spent 10 years in acquisition management assignments, at Aeronautical Systems Division and the Ballistic Missile Office. Then I got my Ph.D. and did operations research assignments, including teaching twice at the Air Force Institute of Technology (AFIT) and an assignment at Air Force Studies and Analysis in the Pentagon.

**BOB SHELDON:** What did you do in your first acquisition assignment?

**GREG PARNELL:** I was a subsystem integrator in the Deputy for Subsystems of the Aeronautical Systems Division. My job was to coordinate government furnished equipment that was manufactured and delivered for installation by defense contractors into the F-111, A-7, F-5, and F-4 aircraft.

**BOB SHELDON:** What problems did you deal with?

**GREG PARNELL:** The biggest challenge was providing the equipment to meet the aircraft contractors need dates. The government was at risk if government subsystems were not

delivered on time for the prime contractors to meet their aircraft delivery dates. Through lots of phone calls, onsite visits, and briefings to managers, we were able to get the subsystem deliveries back on schedule.

I was very fortunate that I got operational experience. In operations you learn to get the job done as best as you can. Operations gave me a real-time focus. In Turkey, I was in charge of changing all the procedures and tactics for a new system. So I had to deal with the acquisition community. When I got to the acquisition community, I better understood acquisition management. Acquisition gave me experience thinking like a decision-maker. The operational and acquisition experiences were of great value in my subsequent analysis and teaching assignments.

**BOB SHELDON:** Did you push to get to grad school or did one of your mentors encourage you?

**GREG PARNELL:** I wanted to eventually go to grad school; but, I was not ready in my senior year. After a couple years in the Air Force, I applied for AFIT.

**BOB SHELDON:** What kind of curriculum did you take in your first masters?

**GREG PARNELL:** It was an 18 month industrial and system engineering program. I took courses in systems engineering, operations research, and industrial engineering. My masters project was a range scheduling simulation for an organization at Eglin Air Force Base, Florida.

**BOB SHELDON:** How did you choose Florida for grad school?

**GREG PARNELL:** I chose some MBA schools but AFIT chose an engineering program for me. My boss, then Lt Col Hank Passi, talked them out of that school. Then AFIT offered me University of Florida. In addition to a good location, they had a great program and great young faculty.

**BOB SHELDON:** Any notable professors?

**GREG PARNELL:** Yes, there were several. Mike Thomas was the department head. He later was Director of the School of Industrial Systems Engineering and then Provost at Georgia Tech. Other well known faculty were Thom Hodges, Don Ratliff, Don Hearn, and Richard Francis. Thom Hodges was my academic and

masters project advisor. Thom later became department head and chaired professor at North Carolina State.

**BOB SHELDON:** Were you part of the acquisition career field at the time?

**GREG PARNELL:** Yes.

**BOB SHELDON:** What was your assignment after the masters program?

**GREG PARNELL:** After my masters program, I went back to Wright Patterson Air Force Base to work for Col Hank Passi, who directed a system program office. I worked on sound suppressors for the F-15 aircraft and then became special projects officer for the director.

**BOB SHELDON:** Did your grad school in industrial and systems engineering help you in your acquisition positions?

**GREG PARNELL:** Yes. Not so much in my first job, but the next job at the Ballistic Missile Office and especially when I became chief of systems engineering. As chief of systems engineering, I had responsibility for missile performance and life cycle cost. For example, one of the problems we worked was to calculate the probability that a missile launch accident could result in a death. We developed a model to calculate that probability. We also developed the life cycle cost model used for all system trade studies.

**BOB SHELDON:** Did you build some of those models yourself or did other people build them for you?

**GREG PARNELL:** The Aerospace Corporation was my systems engineering contractor. They built and operated the models. In one case, I had to redo the probabilistic analysis because it was challenged.

**BOB SHELDON:** When did you start working on ballistic missiles?

**GREG PARNELL:** I started in 1978 and spent four-and-a-half years at the Ballistic Missile Office. I worked on the Mark 12A reentry vehicle for the Minuteman III missile, the MX transporter, and Peacekeeper in Minuteman silos.

**BOB SHELDON:** Were there any interesting challenges you faced?

**GREG PARNELL:** Yes. As a major-select, I managed the MX transporter, the vehicle that moved the missile between multiple protective

structures. My program budget was \$3.3 billion in 1980 dollars. The Director of Engineering told me I had two problems: making sure the transporter worked on desert roads and reducing the life cycle cost.

The mobility challenge was getting a vehicle that weighed over a million pounds to work in the desert on low cost roads. We had a program to test the mobility. The specially developed tires failed very early in the test. We tried commercial off-the-shelf tires (used for large mining trucks) and they worked great. The commercial tires would save money, since the roads did not have to be significantly improved. We also changed the engine to reduce costs and increase reliability.

**BOB SHELDON:** What was the reason for developing special tires?

**GREG PARNELL:** We wanted to save money in shelter construction. The tire height drove shelter construction costs. Commercial tires and reduced road construction costs offset the shelter construction costs.

**BOB SHELDON:** What happened to the MX program?

**GREG PARNELL:** The MX program was cancelled by President Reagan. The missile was named Peacekeeper and placed in Minuteman silos.

**BOB SHELDON:** What was your job after the MX transporter?

**GREG PARNELL:** I became the Chief of Missile Systems Engineering for the Peacekeeper missile. During that job, I applied to get my Ph.D.

**BOB SHELDON:** How were you sponsored for your Ph.D.?

**GREG PARNELL:** I was centrally selected late in the cycle. I had two mentors that told me not to go get a Ph.D. They recommended I be a career acquisition officer. I had two other mentors (with Ph.D.s), that recommended I get a Ph.D.

Although I enjoyed project management, I enjoyed the decision analysis more. I liked to analyze major decisions and present my recommendations to senior leaders more than the day-to-day management. So, I decided to apply. The Air Force told me, "Sorry, we don't have any slots for you." But in late January, someone canceled and I got the slot. I applied



to Stanford, MIT, and Georgia Tech. I was fortunate to go to Stanford.

**BOB SHELDON:** Normally, the Air Force doesn't like to spend money on big tuition colleges. How did you get to Stanford?

**GREG PARNELL:** I requested Stanford. I called a captain at AFIT that approved the school assignments and he was concerned about the high cost. He put me on hold, came back five minutes later and said you can go to Stanford!

**BOB SHELDON:** Where were your assignments on the ballistic missile program?

**GREG PARNELL:** The Ballistic Missile Office was in California, at the old Norton Air Force Base before it closed.

**BOB SHELDON:** So you stayed out in California at Norton?

**GREG PARNELL:** Yes, we were there four-and-a-half years and then we went up to Northern California for three years.

**BOB SHELDON:** How did you narrow it down to the three colleges you applied to?

**GREG PARNELL:** I selected the three schools by calling every operations research school AFIT used. After talking to them about their program, I asked them which three schools were the best. Three schools were mentioned many times: Georgia Tech, MIT, and Stanford. I knew Georgia Tech because I knew the professors there. Two of the professors taught me at Florida. Then I went to MIT in February; the wind howling off the Charles River was unbelievable. I was impressed with their program.

The next week, I flew out to Stanford. The sun was out and it was a spectacular day. I talked to Professor Ronald Howard, one of the fathers of decision analysis. In my meeting with him, the first thing he said was, "How can I help you make your decision?" I was also interested in doing research at the Center for International Security and Arms Control (CISAC). It was a combination of great school, great professors, great opportunities, and great weather!

**BOB SHELDON:** Tell us about some of your notable professors at Stanford.

**GREG PARNELL:** The person that has been the most influential was Howard. Ron was on my committee. Ron is still teaching and

I see him regularly at professional meetings. My advisor was Don Dunn. Don taught public policy, was interested in arms control, and was a member of the CISAC. He taught me that research was asking the right questions. I was fortunate enough to have as my third committee member Alexander George, a well known political scientist. Recently he became emeritus professor. Also, Condi Rice was an assistant director at CISAC. I was a teaching assistant for one of her courses.

**BOB SHELDON:** Did you bump into George Dantzig?

**GREG PARNELL:** I attended talks that he gave, but I never took one of his classes. He was well respected at Stanford.

**BOB SHELDON:** What was your thesis topic at Stanford?

**GREG PARNELL:** I did my dissertation on nuclear arms control during the height of the nuclear arms build up (Parnell, "Large Bilateral Reductions in Superpower Nuclear Weapons," Ph.D. Dissertation, Stanford University, July 1985). We looked at large bilateral reductions in superpower nuclear weapons. We examined the incentives for the two superpowers to comply with or violate the treaty.

**BOB SHELDON:** How did you approach your dissertation technically?

**GREG PARNELL:** The general area was treaty verification. I researched the early writing on verification. We used decision analysis and cooperative game theory. The key issues were technology and information. If both superpowers mutually agreed to do away with nuclear weapons, the nation with the best information and best technology could recover if the other nation violated the agreement.

**BOB SHELDON:** When you were finishing up at Stanford, what kind of a job were you looking for?

**GREG PARNELL:** As I started looking for an operations research job, an officer at the Operational Sciences Department contacted me about teaching at AFIT. They were looking for somebody that had some space experience to lead their Space Operations Program and teach operations research. I decided I would like to teach.

**BOB SHELDON:** What year did you finish at Stanford?

**GREG PARNELL:** I finished in 1985 and went to AFIT.

**BOB SHELDON:** What courses did you teach?

**GREG PARNELL:** I taught operations research (introduction to management science, decision analysis, and simulation) and artificial intelligence courses. I was there three years and then went to the National Defense University (NDU) as a research fellow. I also attended the Industrial College of the Armed Forces, class of 1989.

**BOB SHELDON:** Did you develop any new courses?

**GREG PARNELL:** I developed an artificial intelligence and operations research course.

**BOB SHELDON:** Decision analysis has caught on at AFIT. I see it still continues to be a popular part of their curriculum. How did you pick out the textbook and what you wanted to teach?

**GREG PARNELL:** Joe Tatman was a Ph.D. student with me at Stanford. Joe came to the Math Department and started the decision analysis course during my first assignment. When I came back as Operational Sciences department head in 1993, I introduced the decision analysis sequence in the Operational Sciences Department.

I used Bob Clemen's *Making Hard Decisions* (2nd Edition, Duxbury Press, 1996) for the introductory decision analysis course. It was a new book at the time. I also taught an advanced decision analysis and a decision analysis practice course (using Professor Howard's approach at Stanford). I first started teaching multiple objective decision analysis at Virginia Commonwealth University in 1996. I used Kirkwood's *Strategic Decision Making: Multiobjective Decision Analysis with Spreadsheets* (Duxbury Press, 1997). I gave my notes to Jack Jackson, who taught decision analysis when I left. Jack Kloeber, Stephen Chambal, and others have taught decision analysis at AFIT. Dick Deckro has also been a major part of the decision analysis program. His students have applied Value-Focused Thinking and multiple objective decision analysis in many important problem domains.

**BOB SHELDON:** Did you consider being selected for ICAF a good thing?

**GREG PARNELL:** Yes. I was selected as an NDU fellow. The fellows then attend either ICAF or National War College. My acquisition experience put me in ICAF. I applied because I thought it would be more research oriented and I wanted work on nuclear force analysis. I was excited about going to Washington. Five years later, I was excited about leaving!

**BOB SHELDON:** How was your year at ICAF?

**GREG PARNELL:** It was a great year. I thought I was on an athletic scholarship. I played softball, volleyball, and soccer. My ICAF group studied the nuclear industry. The highlight was the trip to the Soviet Union in the spring of 1989. We were the first NDU group to go to the Soviet Union in many years. Twenty of us visited Moscow, Tbilisi (Georgia), Volgograd, and St. Petersburg.

1989 was a dramatic time in Russian history. When the Secretary of Defense was briefing us, one of the students who wanted to go to the Soviet Union raised his hand and said, "Can we go to the Soviet Union this year?" A week later we found out we could. Since my research project was related to strategic nuclear arms control, I was selected to go.

**BOB SHELDON:** Did you meet some of your Soviet counterparts?

**GREG PARNELL:** Yes, we did. We met Soviet military and civilians in the four major cities.

**BOB SHELDON:** What were your impressions?

**GREG PARNELL:** Russia has a wonderful history and culture. Unfortunately, my impression at the time was that the only thing that worked was the military. The military was very professional. In uniform, we attended the WWII victory celebration in Volgograd. It was a moving ceremony. We were treated like celebrities. The lines at stores were what we expected. The best buildings were built before 1917. The people were in turmoil. One medical student told us, "the only reason you would come to visit us is to laugh at us." We left the Soviet Union on a train from St. Petersburg to Finland. When we crossed the border, everyone on the train cheered and applauded. I wondered what the Russian train employees and guards must have thought.

**BOB SHELDON:** Did you have a Pentagon assignment lined up while you were at ICAF?

**GREG PARNELL:** I wanted to stay five years in DC to get my daughter through high school. As a lieutenant colonel, I was hired by Air Force Studies and Analyses Agency (AFSAA) as a deputy division chief of the Force Analyses Division in the Strategic Forces Directorate.

**BOB SHELDON:** Who did you interview with in Studies and Analysis? Maj Gen Harrison?

**GREG PARNELL:** No, this was during Maj Gen Alexander's tenure. The colonel who hired me retired before I got there. Since I was the senior lieutenant colonel in the division, I became the acting division chief. At the time, all the AFSAA division chiefs were rated. In my first couple of weeks, we did a successful study for General Larry Welch, the Air Force Chief of Staff. The day after the briefing, my Director, Col Knox Bishop told me "You're now the division chief."

**BOB SHELDON:** That first study you worked on, did you use some of your OR experience?

**GREG PARNELL:** Yes, our major model was called the Arsenal Exchange Model, developed by Bill Cotsworth. I had Bert Head (now at NSA) as my deputy division chief and a small group of analysts. The Arsenal Exchange Model used goal programming to optimize nuclear force allocations. (It has subsequently been modified by Bill for conventional forces.) Fortunately, I had taught goal programming at AFIT.

At the time all the strategic force analysts (in different organizations and even in the same organizations) used different strategic force databases! As a result, we could not easily compare the results of studies without a lot of work. We did an interesting study of strategic force models involving the Joint Staff, OSD, Strategic Air Command, AFSAA, and RAND strategic nuclear models. All the models had different algorithms. We wanted to compare the results on standard problems. As we standardized the data and the analysis assumptions, the model results converged to the same answers! I learned a valuable lesson. The three most im-

portant analysis variables are the analyst, the data, and the model—in that order.

**BOB SHELDON:** Were all of those optimization models?

**GREG PARNELL:** Yes, they were all optimization models but with different techniques.

**BOB SHELDON:** What other projects did you work on?

**GREG PARNELL:** One of my bosses, Maj Gen George Harrison, had a wonderful saying. He said, "You can educate in advance, you can support the decision maker in real time, or you can analyze the fallout." I tried to get my division prepared to educate in advance or support in real time. We did a lot of work to support the Air Staff, which supported DoD, the Joint Staff, and U.S. Strategic Arms Reduction Treaty (START) negotiators.

One of the most interesting *support the decision makers in real time studies* was determining the START treaty drawdown requirements. The START negotiating team knew where the superpowers were today and the end point, but they needed milestones to measure treaty compliance. So Doug Owens, Bob Bivins, and I built a linear programming model to evaluate the different alternative drawdown milestones. We showed one set of drawdown milestones was the most robust solution. Our recommendation became a part of the treaty. Of course the study was classified at the time. We later published the study when it was declassified (Owens, D., Parnell, G., and Bivins, R., "Strategic Arms Reduction Treaty (START) Drawdown Analyses," *Operations Research*, Vol 44, No. 3, May-June 1996, pp. 425-434).

**BOB SHELDON:** What was the size of that problem? How many variables and constraints did you work with? Hundreds or thousands?

**GREG PARNELL:** Hundreds. There were many different force structures, delivery vehicles, and weapons, so we had a large number of constraints. You had to have constraints for each milestone. Since we had all the databases and knowledgeable analysts, we did the study in a weekend.

**BOB SHELDON:** Was one of the guys proficient with an LP solver?

**GREG PARNELL:** Yes. We used LINDO.

**BOB SHELDON:** Who in the chain of command did you brief?

**GREG PARNELL:** Initially, we only briefed our two-star. Because it was so close hold within the negotiation chain, it went through the START negotiating team. We briefed at the 06 level, and he took it from there, using our charts to explain it to the State Department negotiators. One of the team, Col Jae Engelbrecht, became one of my good friends. We later worked together on Air Force 2025 and with Toffler Associates.

**BOB SHELDON:** What was the impact of the end of the cold war on AFSAA?

**GREG PARNELL:** I led an interesting study for Maj Gen Harrison. In early 1990, it became increasingly clear that we could not base our force structure analysis on potential NATO/Warsaw Pact conflicts in the Fulda Gap and Soviet/U.S. strategic nuclear balances. We looked for a new framework for force structure analysis. We came up with a force quality methodology (similar to today's capability based planning). We focused on measuring the force qualities we would need in the future for a variety of alternative scenarios. Unfortunately, our briefing had a long convoluted title.

Maj Gen Harrison liked the content but was not comfortable with the title. Later that day, after reading the new Air Force white paper: *Global Reach, Global Power*, I went jogging. While jogging, I figured out what to do. I returned to the office and changed the title of our briefing to *Analyzing Global Reach, Global Power* (Parnell, G. and Eilers, R., "A Methodology for Analyzing Global Reach—Global Power," White Paper, AF Center for Studies & Analyses," Air Force Studies and Analysis Agency, 1990).

I immediately took the new briefing into Maj Gen Harrison. He looked at the new title and said, "That's great." He took the briefing to the Assistant Vice, who said, "Great." The A/Vice took it to the Vice Chief of Staff and in same day it was in the Chief of Staff's package for overnight reading.

We ended up giving the briefing to most of the Air Force leaders in the Pentagon. We had one hour with General Larry Welch, who was the Chief. I briefed for half an hour and General Welch talked to us for half an hour about what he wanted us to do. We incorporated his ideas. Then General Dugan took over, we took the

briefing to him. We spent an hour with him and he sent us to brief Secretary of the Air Force Don Rice. I went to schedule it on Secretary Rice's calendar. Rice happened to walk out of his office and his aide asked the Secretary about the briefing. Secretary Rice looked at the title and told the aide to schedule **four hours** for the briefing.

He spent several hours with us. This was an important lesson for me. Secretary Rice wanted to spend quality time with us because he wanted to get his analytical organization focused on his vision. He heard our ideas and gave us clear guidance on what he expected us to do.

It took AFSAA a year to analytically refocus and change our databases with new scenario data. Greg McIntyre led that important effort.

**BOB SHELDON:** You say Dr. Rice gave you directions in that four-hour session after you briefed him. What kind of directions did he give you?

**GREG PARNELL:** Both Welch and Rice wanted us to focus on the force quality issues. They believed that quantities would be determined more by budget than before. Since development programs take so long, it is critical to get the right force quality in development. Good examples of force qualities were stealth, continuous intelligence, precise navigation, and precision weapons. Of course, there are synergies, knowing precise target locations, using GPS, and dropping dumb bombs has been very effective.

**BOB SHELDON:** Let me backtrack. When did you first go to a MORS Symposium?

**GREG PARNELL:** I went to a MORS Symposium in about 1986 and got involved in working groups during my AFIT assignment. Clay Thomas and Jim Bexfield got me into MORS leadership. Clay was the Chief Scientist and Jim Bexfield was Chief Analyst of the Air Force Studies and Analyses Agency while I was at AFIT. They visited us every year to bring thesis topics. They became life-long mentors, as I'm sure Clay was to you. While I was at ICAF, they helped me get elected to the MORS Board of Directors. I became a director in 1989 as I started at Studies and Analyses.



**BOB SHELDON:** You've done a number of tutorials at MORS. When did you start doing those?

**GREG PARNELL:** I started in about 1996. The tutorials were about Value-Focused Thinking using multiple objective decision analysis.

**BOB SHELDON:** What was your initial impression of MORS when you first attended a MORS Symposium?

**GREG PARNELL:** I was very impressed from the start by the MORS staff (Dick Wiles, Natalie, and Cynthia) and the quality of the participants. I thought it was just a great professional society; much better organized and more customer focused than other professional societies.

**BOB SHELDON:** Do you recall some of your early MORS committees?

**GREG PARNELL:** I was on the Prize Committee the first year. Then I went through the meetings side. I was the Working Group/Composite Group Chair my second year. I met a lot of MORS leaders coordinating all the working groups and composite groups. My next job was Vice President for Meeting Operations. I led a major working group realignment to provide better post-cold war focus. The next year I served as President, then Past President. I learned that the best job in MORS is Past-Past President! The job has good prestige and no assignments!

**BOB SHELDON:** As VP for Meeting Operations, did you face any hurdles?

**GREG PARNELL:** Things were organized pretty well. I inherited a good slate of meetings. We generated more ideas and we executed the ones the sponsors wanted.

**BOB SHELDON:** I think you were the second active duty officer to become President of MORS. Did you have any trepidation about conflict of interest for active duty officers?

**GREG PARNELL:** I can't recall any concerns or any conflict of interest issues that occurred during my tenure.

**BOB SHELDON:** Any other tough issues during your time on the MORS Executive Council?

**GREG PARNELL:** I was fortunate to follow E. B. Vandiver and Van had a great plan to build on. My theme for the year was quality support to our customers. I tried to continue to

focus our activities on our clients and analysts. We also moved the *Military Operations Research Journal* closer to realization.

**BOB SHELDON:** You briefed each of the sponsors as the MORS President? Remember any specific feedback you got from them?

**GREG PARNELL:** I do remember that they gave us clear guidance on the meetings they wanted. I do not recall any other specific feedback.

**BOB SHELDON:** You were involved in developing a workshop for Admiral Owens. How did MORS get such a quick turnaround for the meeting?

**GREG PARNELL:** I think it was the year after I was President. When you have the Vice Chairman of the Joint Chiefs ask you to help, everybody was motivated. People thought it was a great opportunity to participate.

**BOB SHELDON:** Do you recall any of the fallout after that meeting?

**GREG PARNELL:** Change in the military (or any large organization) is difficult. Some did not understand Admiral Owens' joint warfare objectives and some opposed these objectives actively or passively. Some wanted to continue to think about major service systems and not have to show how service systems supported joint warfare.

**BOB SHELDON:** Let's get back to your time at AFSAA. Talk about the transition when Brig Gen Eberhardt took over and AFSAA became part of PE. Was it difficult to make that transition?

**GREG PARNELL:** Very difficult. Maj Gen George Harrison, AFSAA commander, put together a team which I led. Dan Barker was a key member of the team. He gave us one day to reorganize Studies and Analyses. We had about ten people from all the AFSAA divisions on the team. There were a couple guidelines. First, we had to have an organizational element providing resource allocation analysis support to PE. Second, General McPeak, then Chief, had a new rule we had to follow—colonels could not work for more than one colonel in their management chain. This was a big deal. In Studies and Analyses we had Colonels as directors, deputy directors, and division chiefs. Since the Commander of AFSAA would be a colonel we

could have only divisions. (Later Tom Cardwell became the Commander of AFSAA.)

I'll never forget the expression on Maj Gen Harrison's face when we showed him the number of analysts he had out of 150 people. We were able to reorganize to about 100 people without a significant change in the number of analysts. However, we since developed about a 30 person Resource Analysis Division that reduced the number of analysts available for previous AFSAA missions. Our reorganization plan was briefed to Maj Gen Harrison and Brig Gen Eberhardt. The plan was accepted without change.

**BOB SHELDON:** You did the planning for the transition of AFSAA under PE. How was the actual transition?

**GREG PARNELL:** The transition was difficult. Working for PE changed the culture of the organization. The culture of Studies and Analyses was about the number of stars that you could brief the results of your study. We now had a BG, and not MG, who was focused on resource allocation to develop the Air Force Program. His focus was the Planning Programming Budgeting System process, not briefing studies. So the people in the new Resource Analysis Division were getting all the visibility with PE. During the major programming phase, PE focused only on resource allocation. After these intense phases, the PE leadership took leave and then started preparing for the next cycle.

My division's job was to provide resource allocation analyses to support senior leader decision-making. To make a large number of program decisions (50–100 per briefing), we had to boil everything down to one analysis chart. AFSAA analysts would do a briefing and then one of my guys would work with them to boil it down to one chart. If an explanation was required, I would explain the chart since the analysis team was not in the briefing. This was a major culture change. The AFSAA analyst may have had a direct impact on a budget decision but did not get to brief his/her 30 charts to several generals.

**BOB SHELDON:** I understand that Brig Gen Eberhardt used different ways of introducing you to the Secretary of the Air Force as

compared to the Chief of Staff of the Air Force. Explain that.

**GREG PARNELL:** At that time, General McPeak was the Chief and Don Rice was the Secretary. General McPeak did not like the word "analysis." On the other hand, he liked good data to help him make decisions. So when I would brief General McPeak, Brig Gen Eberhardt would say, "This is Greg Parnell from Air Force Programs and Evaluation." When we took the same briefing to the Secretary of the Air Force, Don Rice, former President of RAND, he would say, "This is Greg Parnell from Air Force Studies and Analyses."

**BOB SHELDON:** Give us more of your impressions about Dr. Rice.

**GREG PARNELL:** Don Rice was a great Secretary of the Air Force. He led the Air Force in a very critical period. He was easy to brief and asked great questions. He was very involved in resource allocation. He wanted to get programs in the right mission bins and then look at tradeoffs within the missions. Most of our analysis for him was within the missions, e.g., space systems, conventional forces, nuclear forces. He and the Chief decided the relative allocation between missions.

I remember one amusing story. We briefed the Air Force budget to him with the Vice Chief and all the three-stars. This briefing was very long. You could tell people were starting to squirm in their seats. Finally, his aide said, "Sir, there's a telephone call you need to take." The Air Force senior leaders literally knocked chairs over as they rushed to the bathrooms!

**BOB SHELDON:** You spent a number of years in the nuclear analysis. Did you ever get any advice from Lt Gen Glenn Kent?

**GREG PARNELL:** Yes. Two of my early mentors Colonels Bill Crabtree and Carl Case connected me with Glenn Kent. When I was managing the MX Transporter I had built a chart to explain my development program. When the chart was presented to the Air Force Scientific Advisory Board, Lt Gen Kent said, "That was a great chart, who developed it?" And they said, "This young guy out of ballistic missile office." Subsequently, Colonels Crabtree and Case arranged for me to spend one full day with Glenn Kent. He provided some lessons that I still use:

- "There are benefits and there are costs. Never mix the two."
- "Always look at the maximum benefit for fixed cost or the minimum cost for fixed benefit."
- "If a briefer does not precisely define the terms used in the briefing, it will be a waste of time to hear their briefing."

When I was department head at AFIT, every year we invited him to talk to students and faculty. It was always a great visit. Here is one of my favorite Glenn Kent stories. We were having dinner at the Officers' Club at Wright Patt. At the time, he was strongly advocating his 'Strategy to Task' methodology. He said "Greg, what is your opinion of Strategy to Task." So I thought carefully and said "I like it because it's a very logical process starting with the strategy through the operations concept to the tasks. However, magic has to occur in about two places." He looked at me, and without missing a beat, said, "Only two?"

**BOB SHELDON:** At the end of your tour at AFSAA, did you want to return to AFIT or did somebody twist your arm?

**GREG PARNELL:** No, I wanted to go to AFIT. Maj Gen Eberhardt wanted me go to J-8 with him but finally agreed to let me go. After the Air Force, I planned to be a professor and a consultant. The best transition path for me was to go back to AFIT as department head.

**BOB SHELDON:** I take it you really enjoyed your first tour teaching at AFIT? What was it you found so attractive about the teaching environment?

**GREG PARNELL:** Yes, I did. I have always enjoyed teaching and mentoring students. I liked the variety of problems and the ability to choose the problems I work on. I usually did not get to choose my problems in Studies and Analyses. I also liked the flexible schedule. I could take off at 4:00 to coach my son's soccer team, spend time with the family, and then prepare my lecture at 9:00 at night (usually for the next day!).

**BOB SHELDON:** One of the ongoing issues is keeping AFIT responsive to the Air Force's needs. How did you address that issue?

**GREG PARNELL:** I designated a faculty member as liaison with every major command

analysis office. Their job was to coordinate thesis topics, slots for graduates, and trips to AFIT. I tried to align the assignments with research interests. We also encouraged students to do funded research for the major commands for their thesis work.

**BOB SHELDON:** Can you think of any specific things you did to respond to Air Force needs during your tenure at AFIT?

**GREG PARNELL:** Yes, that is another good story. Remember, I mentioned Jae Engelbrecht from our arms control studies. Shortly after I had gotten to AFIT, Jae called me up on a Thursday afternoon. He said, "Greg, I need your help. We have done this study called SPACECAST 2020. We are 11 months into a 12-month study and we have no idea how to evaluate the alternatives. Our study director, Lt Gen Jay Kelley has to brief General McPeak, who commissioned the study. Can we fly out tomorrow morning and meet with you Friday afternoon and Saturday?" My friends call this story "Desperate men come to Dayton, Ohio."

The study alternatives were space system concepts. Engineering data did not exist to evaluate the alternatives using models and simulations. We developed a multiple objective decision analysis methodology to rank the alternatives. Roger Burk, one of my faculty and now a colleague at USMA, worked with me on the study (Burk, R. C. and Parnell, G. S., "Evaluating Future Space Systems and Technologies," *Interfaces*, Vol 27, No 3, May-June 1997, pp. 60-73).

The next week Roger and I went to Maxwell to brief Lt Gen Jay Kelley and all his senior staff. I knew it was important when he said, "This discussion has no time limit." After a detailed briefing and lots of discussion, he approved our plan. Roger worked full time for a month on the analysis. The study and the analysis were very successful.

This study led to a major AFIT role in Air Force 2025 which I supported as a consultant to the Air Force (Jackson, J. A., Parnell, G. S., Jones, B. L., Lehmkuhl, L. J., Conley, H., and Andrew, J., "Air Force 2025 Operational Analysis," *Military Operations Research*, 1997, Vol 3, No 4, pp. 5-21). AFIT worked for a full year on the second study. Air Force 2025 made an important impact on the Air Force.

**BOB SHELDON:** After you had been at AFIT, you decided to hang up your hat and retire. What was your decision algorithm for deciding what to do at that point?

**GREG PARNELL:** That's a great question. I took up golf while I was in Dayton because my sons wanted to play golf. My good friend Bill Rowell got the three of us into golf. We decided we wanted to move to a more golf friendly climate. Timing for my second son's high school was also a consideration. I decided to retire at 25 years to give him three years at his new high school. I interviewed with a several schools but decided to go Virginia Commonwealth University (VCU) in Richmond, VA.

**BOB SHELDON:** Was it traumatic to retire from the Air Force, or was it something you looked forward to?

**GREG PARNELL:** It was not traumatic. We retired near Fort Lee and a lot of our friends were retired officers. I also started doing consulting on military problems.

**BOB SHELDON:** What courses did you teach at Virginia Commonwealth?

**GREG PARNELL:** I taught two existing courses (deterministic and stochastic methods) and I added two courses. The first was decision and risk analysis (similar to AFIT course but added risk analysis material). I also developed a new multiple objective decision analysis course. This is the course I mentioned earlier that Jack Jackson introduced at AFIT.

**BOB SHELDON:** You've been teaching Value-Focused Thinking (VFT) to your students and in professional short courses. When did you first pick that up?

**GREG PARNELL:** Multiple objective decision analysis (Keeney, R.L. and Raiffa H. *Decision Making with Multiple Objectives: Preferences and Value Tradeoffs*, New York: Wiley, 1976) is the mathematics behind Value-Focused Thinking (Keeney, R.L. *Value-Focused Thinking: A Path to Creative Decisionmaking*, Cambridge, Massachusetts: Harvard University Press, 1992). We use VFT to define our values and use our values to create better alternatives. SPACECAST 2020 used multiple objective decision analysis to evaluate the alternatives but in one month, we did not have time to use VFT to improve the alternatives. Air Force 2025 was my first use of

VFT. While at VCU, I started teaching multiple objective decision analysis short courses. In the last 10 years, I have taught over 30 of the courses for government and industry.

**BOB SHELDON:** Did you ever work with Ralph Keeney, developer of VFT?

**GREG PARNELL:** I know Ralph well from the Decision Analysis Society and journal editorial activities.

**BOB SHELDON:** How did you like the teaching at VCU as opposed to AFIT?

**GREG PARNELL:** I enjoyed teaching at VCU. We had a small operations research program with many of our graduate students being part time with jobs in the Richmond area. Part time students were not able to focus on research as much as the full time AFIT students.

**BOB SHELDON:** So after four years, did you jump at the chance to go to West Point?

**GREG PARNELL:** No. When the first West Point faculty member asked me to apply, I said no. VCU had treated me well and my wife enjoyed Richmond. Then a second faculty member called. Again, I said no. I had just gotten tenure and an academic promotion. Finally, the department head, COL Jim Kays, called. After talking to Jim, I went home and told my wife that maybe the Lord was trying to tell us something. So we talked about it and I took Eileen with me to the interview. When I was offered the job, we decided to go to West Point.

**BOB SHELDON:** Have there been a lot of changes in the Systems Engineering Department since you have been here?

**GREG PARNELL:** Yes. The department was started in 1989 by Jim Kays. The second department head, Mike McGinnis, arrived the same summer as I did. It has been my honor to serve with Mike. He and his leadership team built on a solid foundation and developed many new programs to take the department to the next level (McGinnis, Michael L., Ph.D., "Transforming the Department: 1999-2004" Technical Report No. DSE-TR-04-29, DTIC #: ADA424113, Operations Research Center of Excellence, Department of Systems Engineering, West Point, NY, May 2004).

**BOB SHELDON:** Tell us about the Chair that you filled.



**GREG PARNELL:** I have just finished a six-year tour as the Class of 1950 Chair of Advanced Technology in the Department of Systems Engineering. The class donated funds to the academy to fund a chair. The chair holder would rotate between engineering departments. I was selected as the first chair. It was a great opportunity to meet and work with the Class of 1950. In summer 2005, General Paul Kern, USA, retired, became the second chair holder. GEN Kern will teach in the Civil and Mechanical Engineering Department.

**BOB SHELDON:** What's your position in the fall?

**GREG PARNELL:** I'll be on sabbatical for a year. Then I'll return as a Title 10 Professor.

**BOB SHELDON:** What's a Title 10 Professor?

**GREG PARNELL:** All of the civilian professors and key academic staff are Title 10 instead of GS. We serve on six-year renewable contracts with a separate pay scale.

**BOB SHELDON:** How would you compare teaching here at West Point to AFIT?

**GREG PARNELL:** It's undergraduate versus graduate material. Also, AFIT students were older, usually married, and more focused on academics. The cadets are very smart and (generally) hard working. Cadets have many other activities. However, they're great young men and women, and it's an honor to be here.

**BOB SHELDON:** What about the West Point area appeals to you?

**GREG PARNELL:** We live in a very nice village called Cornwall-on-Hudson just over the mountain north of West Point. We are 45 minutes from "The City." For seven months a year it is great. The Hudson Valley is relatively cool in summer, lovely in spring, and spectacular in the fall. Then there is winter.

**BOB SHELDON:** But you lived in Dayton so you're used to that.

**GREG PARNELL:** That's true.

**BOB SHELDON:** Tell us about your association with Toffler Associates.

**GREG PARNELL:** While in the Air Force, I worked on SPACECAST 2020 for Lt Gen Jay Kelley, Air University Commander. Dick Szfranski, and Jae Engelbrecht also had key roles in the study. After I retired, I worked on Air Force 2025 with the same team. The next year

all three retired and helped found Toffler Associates, a new consulting firm founded by Alvin and Heidi Toffler, the well known futurists and authors of *Future Shock* and the *The Third Wave*, and Tom Johnson, a very experienced consultant.

After retiring I had consulted with IDA and TASC. Then Dick Szfranski asked me to consult with Toffler Associates. I decided it would be fun to work with them and a great opportunity to meet and work with Alvin and Heidi. I worked with Toffler Associates on a variety of strategic planning and some decision analysis projects for six years.

**BOB SHELDON:** How did you decide to change to Innovative Decision Inc.?

**GREG PARNELL:** In late 2003, Terry Bresnick, President of Innovative Decision, Inc., approached me about joining a new decision analysis consulting firm that he and other partners were forming. One partner, Joe Tatman, was a good friend. In addition, I had known Terry and Dennis Buede for years. I had been thinking about more technical work and this was an ideal opportunity. Since then, IDI has grown to about 20 people.

**BOB SHELDON:** What customers do you support?

**GREG PARNELL:** IDI works with intelligence, defense, homeland security, and commercial companies. In addition, they teach decision analysis and systems engineering courses. I work part-time on IDI projects. I do some travel and do other work at home.

**BOB SHELDON:** What courses are you teaching now?

**GREG PARNELL:** I teach decision analysis and operations research courses. We have no more than 18 students per section. I teach two sections per semester and lead a senior cadet capstone research project with three to five cadets per year.

**BOB SHELDON:** What kind of capstone projects have you led?

**GREG PARNELL:** I have done a variety of them in the six years. I started with an intelligence project for the Army Ground Intelligence Center. Then we worked on Army resource allocation projects for G-3 for three years. For the last two years, I have worked on base realignment and closure implementation.

**BOB SHELDON:** What major studies have you been involved in at West Point?

**GREG PARNELL:** I have worked on three major studies. The first study was the Installation Management Study (IMA) led by then COL Tim Trainor. The purpose of the IMA study was to assess the regional organization structure of IMA. This was a six month study. The second study was the Residential Community Initiative (RCI) Study led by COL Bob Powell. The purpose of this six month study was to review the RCI program and make recommendations for improvement. Both of these studies were done for the ASA (Installations and Environment). The third major study I worked on was the Army Base Realignment and Closure 2005 study. I spent about three years working on the study. I supported Dr. Craig College, COL Bill Tarantino, and LTC Lee Ewing.

**BOB SHELDON:** You've also been involved with INFORMS. Tell us how you got involved in that.

**GREG PARNELL:** Like MORS, I got involved by going to the meetings. My INFORMS involvement was in three areas: the Military Applications Society (MAS), the Decision Analysis Society (DAS), and the Richmond-Tidewater Chapter of INFORMS. I usually participated in MAS and DAS sessions at INFORMS. I helped establish the Richmond-Tidewater chapter of INFORMS and served as President. Shortly after coming to West Point I got elected to the councils of both MAS and DAS. I chose to focus on the DAS because decision analysis is my primary research area. I was elected President of DAS in 2004. I will serve as President until October 2006. Then I will serve as Past President for two years. After being president of DAS and MORS, I plan to retire from professional society elected offices! Both have been great opportunities for service and building friendships.

**BOB SHELDON:** How large is the Decision Analysis Society?

**GREG PARNELL:** We are currently the second largest society in INFORMS with about 940 members.

**BOB SHELDON:** Do you hold your own separate meetings?

**GREG PARNELL:** We hold our meetings in conjunction with INFORMS. We also support decision analysis tracks at international meetings.

**BOB SHELDON:** Does DAS tend to be mostly academics?

**GREG PARNELL:** Professors and students make up 57% of the membership. The rest are practitioners.

**BOB SHELDON:** Since you've been involved in several different national societies, talk about MORS as a professional society compared to the others.

**GREG PARNELL:** MORS is my favorite professional society. MORS is very well run and mission focused. I have made a lot of great friends through MORS. My contacts in MORS led directly to my job at West Point.

**BOB SHELDON:** You just received the Thomas Award, and Clay Thomas was one of your mentors. What was your relationship and what did you learn from him?

**GREG PARNELL:** Clay could always see the essence of the problem and would always provide sound advice. In AFSAA, when I started a new project, I would take my ideas to Clay for advice. I would sit in his office and just explain what I was doing and get his thoughts. He was always very helpful. Many times, he would say, "Well, we wrote a paper on that." He would shuffle through a pile of papers and pull out the paper! Also, he always gave sage advice on MORS activities.

**BOB SHELDON:** Now you mentor young analysts. Do you have any young analysts that you've mentored that have done well and you would like to claim you have influenced?

**GREG PARNELL:** I enjoy working with and mentoring young analysts. I like to claim I influenced all of them! I know I learn a lot from each of them. Jack Jackson was a student of mine as a young major. He worked for me at AFIT and we worked on research projects after I retired. He currently works for SAIC. We sponsor his son Daniel at West Point. I hired Jack Kloeber as a new Army LTC at AFIT. We have worked together on several studies and professional society activities. He's currently in charge of pharmaceutical R&D portfolio analysis for Johnson & Johnson. More recently, I worked closely with several great young offic-

ers at West Point. LTC Barry Ezell, one of these outstanding officers, is now at Army Capabilities and Integration Center. Another officer, MAJ Brian Stokes now works for Army G-8. On BRAC, I worked closely with LTC Lee Ewing, now a professor at NPS. Lee did a great job on BRAC. At IDI, I work closely with Don Buckshaw and Bob Liebe, two outstanding decision analysts.

**BOB SHELDON:** Since MORS helps foster mentoring, any advice about how we can do a better job of that?

**GREG PARNELL:** I like the junior/senior analysts sessions that we have. I think those are very useful. But most mentoring happens informally. For example, Jim Bexfield mentored me and helped me get elected to the MORS Board. Later, he asked me to be a consultant for him when he was at IDA.

**BOB SHELDON:** You're presenting a paper this week. Will you be sitting in some of the other working group sessions?

**GREG PARNELL:** I will be attending the Decision Analysis Working Group.

**BOB SHELDON:** Talk about your duties as the MOR Journal editor.

**GREG PARNELL:** Our first editor, Peter Purdue, gets the primary credit for establishing the MOR Journal. Jim Kays and E.B. Vandiver played very important roles. I was the second editor. My job was to maintain quality and increase production. We had to obtain more quality papers and get more reviewers involved to speed up the review process. I viewed it was my job to talk people into writing papers and to select great associate editors. I served as Editor for over five years until the selection of Dick Deckro. Dick has done a great job with the journal.

**BOB SHELDON:** Did you just use the connections you had from your MORS years, or did you find some new contacts?

**GREG PARNELL:** Both. We took award papers and published them each year. I used every opportunity to encourage people to write up good studies for publication. Each year, I deputized every Board member to help. I told them you either have to find a paper or write a paper! It was a lot of work but we got the production rate up thanks to the great work of the authors and the associate editors.

**BOB SHELDON:** We always have a tradeoff between good peer review of the papers and timely turnaround. How did you manage the tradeoff between those two?

**GREG PARNELL:** It's all about people. I found good people that could do quality reviews in a timely manner. To ensure quality each paper had to be recommended for acceptance by two associate editors: one from the operations research technique and one from the problem domain. For example, a paper using an optimization model for a naval application would have two reviewers: an optimizer and a naval expert. The optimizer's job was to assess the quality of optimization work. The naval expert's job was to assess the value of the work to the naval application area.

**BOB SHELDON:** How many of them came back with two yes's?

**GREG PARNELL:** We had an acceptance rate of about 45%. Almost no papers were accepted on the first review. Papers were usually accepted subject to revisions.

**BOB SHELDON:** How do you view our MOR technical papers as compared to technical papers in other journals?

**GREG PARNELL:** I think the journal is very good. Our niche is military operations research applications. We also publish some articles on military OR theory and heritage. Although we are a relatively new journal by academic standards, the journal has established a record of quality articles. I believe it is the best journal for military OR applications in the world.

**BOB SHELDON:** What other professional service activities have you been involved in?

**GREG PARNELL:** Since 2002, I have been a member of the Technology Panel of the National Security Agency Advisory Board. I spend two days a month supporting them.

**BOB SHELDON:** Any other parting shots?

**GREG PARNELL:** As I reflect back on my career, I have been very fortunate. First, I have had wonderful support from my wife and family. They have let me pursue education opportunities and take new job challenges. Second, I was able to have operational and management experience before I became an operations research analyst and professor. This gave both: experience and credibility. Third, I was very

fortunate to have mentors that gave me great advice along the way. Fourth, I have had the opportunity to work on very important projects with great people. I have worked on Air Force, Army, intelligence, environmental, and homeland security problems. I have made life long

friendships. Fifth, I have had significant opportunities for professional service in professional societies and advisory boards. These have also led to wonderful friendships. Finally, I have had many opportunities to mentor young officers and civilians.